

**University of Rochester
Laboratory for Laser Energetics**

**Laboratory Basic Science Experiments
at the Omega Laser Facility
Fiscal Year 2020**

Date Issued: February 13, 2019

Applications Due: April 2, 2019

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PART I – LABORATORY BASIC SCIENCE PROGRAM DESCRIPTION

A. Background.

The University of Rochester's (UR) Laboratory for Laser Energetics (LLE) is the home of the Omega Laser Facility, which includes OMEGA—a 30-kJ UV, 60-beam laser system (at a wavelength of 0.35- μm), and OMEGA EP—a four-beam high-energy UV long-pulse laser system, two of which can be compressed for high-intensity, short-pulse operation (at a wavelength of 1.053- μm).

The Omega Laser Facility is maintained and operated by UR/LLE for DOE/NNSA. As a part of its mission, UR/LLE provides shot opportunities on the Omega Laser Facility to participating laboratories in the NNSA ICF program (LLNL, LANL, SNL, NRL, and LLE) and the DOE Office of Science laboratories (Ames Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, Fermi National Accelerator Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Princeton Plasma Physics Laboratory, SLAC National Accelerator Laboratory, and Thomas Jefferson National Accelerator Facility) to conduct basic science experiments in the general areas related to high-energy-density physics.

Subject to funding, ~10% of the annual operating time of the Omega Laser Facility may be available for Laboratory Basic Science (LBS) experiments in FY20. The LBS Program is administered by the UR/LLE National Laser Users' Facility (NLUF) Manager who issues an annual solicitation proposal. The proposals are reviewed by the LBS Review Committee consisting of scientists from the user laboratories, as well as at least two independent members. The Committee members are appointed by the UR/LLE Director. This committee will peer review all LBS proposals on merit and make recommendations to the LLE Director of proposals in rank order including a recommended time allocation at the Omega Laser Facility.

B. Areas of Research.

The research tools and resources of the UR/LLE Omega Laser Facility are available to laboratory scientists (as defined in Section A) for state-of-the-art basic science experiments in laser-matter interaction and related diagnostics. This includes, but is not limited to, high-energy-density physics, plasma physics, spectroscopy of highly ionized atoms, laboratory astrophysics, fundamental physics, materials science, high field science, plasma-based secondary sources, biology, and chemistry.

Basic research is defined as research directed toward increasing knowledge in a particular field of science. The primary aim of basic research is a fuller knowledge or understanding of the subject matter under study, rather than any immediate application of that knowledge to NNSA's mission. Science relevant to inertial fusion will be considered but will be judged solely on the basis of its quality as basic science. In particular, the results of the experiment must be of significant interest in other fields, consistent with guidelines for publication in a highly ranked journal.

C. Solicitation Schedule.

<u>Event</u>	<u>Target Date</u>
Program Announcement Issued	February 13, 2019
Applications due (via pdf files)	April 2, 2019
Selection of projects for award	May 31, 2019
Experiments conducted	October 1, 2019 to September 30, 2020

Proposals must be received in full by 17:00 ET on 2 April 2019 at UR/LLE at the following address:

omegabasicscience@lle.rochester.edu

PART II – SHOT ALLOTMENT (AWARD) INFORMATION

A. Type of Award Instrument.

Only Omega Facility time (including OMEGA EP) is available through this competition. There is no funding or other material support provided via this program.

B. Expected Number of Awards.

A total notional allotment of approximately 12 OMEGA and 8 OMEGA EP shot days may be available for this program in FY20. For planning purposes, one OMEGA shot day typically produces 11 target shots while one OMEGA EP shot day is expected to produce approximately 7 target shots. For shot time allocation purposes, a joint OMEGA and OMEGA EP target shot day is equivalent to one OMEGA shot day and one OMEGA EP shot day.

C. Anticipated Award Size.

The minimum shot allotment is anticipated to be one half day for OMEGA, and one day for OMEGA EP, respectively. Proposals that require less than the required minimum time on a laser will not be accepted. While there is no maximum shot allocation beyond those stated in Section B above, the normal shot allotment for each award is 1 to 2 days.

D. Period of Performance.

The program is for OMEGA and OMEGA EP shots during FY2020 only.

PART III – Eligibility Information

A. Eligible Applicants.

Only proposals led by scientists from the NNSA ICF laboratories (LLNL, LANL, SNL, NRL, and LLE), and from DOE Office of Science laboratories (Ames Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, Fermi National Accelerator Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Princeton Plasma Physics Laboratory, SLAC National Accelerator Laboratory, and Thomas Jefferson National Accelerator Facility) will be considered for this program. These proposals should not duplicate efforts being conducted or proposed to be conducted through the NNSA-funded UR/LLE NLUF program and the Office of Fusion Energy Sciences-funded LaserNetUS program, nor proposals submitted through the ICF and HED Omega Facility allocations.

PART IV – APPLICATION AND SUBMISSION INFORMATION

A. APPLICATION PACKAGE.

All application forms and instructions are included in this solicitation.

B. LETTER OF INTENT AND PRE-APPLICATION

1. Letter of Intent.

Letters of Intent are not required.

2. Pre-application.

Pre-applications are not required.

C. CONTENT AND FORM OF APPLICATION

1. COVER.

The cover page of the proposal shall include all the information requested in Appendix A.

2. FACILITY REQUIREMENTS/PROPOSAL SUMMARY

The second and third pages of the proposal shall be the filled-out Proposal Summary Form (Form B) of Appendix B and the filled-out Facility Experimental Configuration Summary (Form C) of Appendix C. The primary facility (OMEGA or OMEGA EP or both) where the work will be performed must be indicated. If the project requires extraordinary support (such as unusual target fabrication or non-standard laser or diagnostics configurations) such requirements and the source of such support must be identified.

3. PROJECT NARRATIVE

The project narrative MUST NOT exceed **10** pages, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5-in. by 11-in. paper with 1-in. margins (top, bottom, left, and right). EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed.

The project narrative must include:

Project Objectives. This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

Merit Review Criterion Discussion. The section should be formatted to address each of the merit review criterion and sub-criterion listed in Section V.A. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria.

Relevance and Outcomes/Impacts. This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts.

Project Timetable. This section should outline as a function of time, year by year, all the important

activities or phases of the project, including any activities planned beyond the project period. Successful applicants must use this project timetable to report progress.

Equipment. Information on the experimental equipment requirements of the projects, including both standard equipment items, which may be provided by UR/LLE, and any special equipment to be purchased or provided by the applicant.

Laser Configuration. Provide information on the OMEGA and/or OMEGA EP Laser, diagnostics, and target requirements for the proposed work, including number of shots, number of beamlines, total energy on target as well as a beam-to-beam energy variance, pulse shape, beam smoothing, plasma and laser diagnostics, target specifications, and other requirements that are important to the conduct of the proposed experiment. The NLUF Users Guide available at:

<http://www.lle.rochester.edu/about/nluf.php> may be consulted for facility information.

Collaborations. Information on collaboration with scientists at UR/LLE or other institutions that are required for the conduct of the proposed work, including official institutional confirmation of the acceptance of such collaborations in the appendices.

Roles of Participants. For multi-organizational or multi-investigator projects, describe the roles and the work to be performed by each participant/investigator, business agreements between the applicant and participants, and how the various efforts will be integrated and managed. This section must not exceed 1 page.

Evaluation Phase. This section must include a plan and metrics to be used to assess the success of the project.

4. BIBLIOGRAPHY AND REFERENCES CITED: FACILITIES AND OTHER RESOURCES AND EQUIPMENT.

Bibliography and References. Provide a bibliography for any references cited in the Project Narrative section. This section must include only bibliographic citations.

Facilities and Other Resources. Identify the facilities (e.g., office, laboratory, computer, etc.) to be used at each performance site listed and, if appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Provide any information describing the other resources available to the project, such as machine or electronic shops. This section must not exceed 1/2 page.

Equipment. List important items of equipment already available for this project and, if appropriate, note the location and pertinent capabilities of each.

5. RESEARCH AND RELATED: Senior/Key Person.

Complete the required profile information for each senior/key person proposed. A senior/key person is any individual who contributes in a substantive, measurable way to the scientific/technical development or execution of the project. For each senior/key person provide:

Biographical Sketch.

Complete a biographical sketch for each senior/key person and attach in the block provided.

The biographical information for each person must not exceed 1 page when printed on 8.5-in. by 11-in. paper with 1-in. margins (top, bottom, left, and right) with the font not smaller than 11 point.

D. SUBMISSION DATES AND TIMES.

1. Pre-application Due Date.

Pre-applications are not required.

2. Application Due Date.

Applications must be received by April 2, 2019, not later than 17:00 Eastern Time.

You are encouraged to transmit your application well before the deadline.

APPLICATIONS RECEIVED AFTER THE DEADLINE MAY NOT BE REVIEWED OR CONSIDERED FOR AWARD.

E. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS

1. Where to Submit

APPLICATIONS MUST BE SUBMITTED VIA e-MAIL

Submit electronic applications in **pdf form** to:

omegabasicscience@lle.rochester.edu

Part V – APPLICATION REVIEW INFORMATION

A. CRITERIA

1. Initial Review Criteria.

Prior to a comprehensive merit evaluation, UR/LLE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the OMEGA/OMEGA EP shot opportunity announcement. (5) The proposed experiments are consistent with the capabilities of the facility.

2. Merit Review Criteria.

Applications will be reviewed in accordance with the following criteria:

Applications will be technically evaluated based on the four general scientific/technical criteria listed below in descending importance with a relative weighting in the approximate ratio of 4:3:2:1:

- (1) The overall scientific/technical merit of the project and its relevance and prospective contribution to its field of research;
- (2) The scientific/technical soundness and quality of the proposed method/approach, and the feasibility/likelihood of accomplishment of the stated objectives;
- (3) The competence, experience, and past performance of the proposer, principal investigator, and/or key personnel; and,
- (4) The demands of the project in terms of resource requirements (equipment, beam time, etc.) and/or other requirements (facility hardware modifications, component development, etc.) vis-à-vis competing demands.

Teams that have previously been awarded Omega LBS time on the same topic will need to provide a description of what has been learned, the status of the analysis, and a list of any publications from previous LBS shots that have appeared or have been submitted for publication.

Although it is not required, involvement of postdoctoral fellows and graduate students in the proposed LBS experiment is encouraged.

B. REVIEW AND SELECTION PROCESS.

1. Merit Review.

- Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in Section A above.

2. Selection.

The UR/LLE Director will make the final decision concerning the award of OMEGA/OMEGA EP shot opportunities for the LBS Program based on the peer review committee recommendations.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.

Successful principal investigators will be notified on or about May 31, 2019 for experiments to be conducted in FY20 starting on October 1, 2019.

Part VI – AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES.

1. Notice of Selection.

UR/LLE will notify applicants selected for award.

B. OMEGA OPERATIONS REQUIREMENTS.

1. LFORM.

Users of the UR/LLE facilities are expected to comply with the UR/LLE laboratory policies and procedures as identified in the OMEGA Laboratory Facility Organization and Regulation Manual: <http://www.lle.rochester.edu/media/resources/documents/3000.pdf>

PART VII – OMEGA FACILITY CONTACTS

A. CONTACTS.

Questions relating to the Omega Laser Facility, the Laboratory Basic Science program and proposal submission procedures should be addressed to:

Dr. Mingsheng Wei, Manager
National Laser Users' Facility
Laboratory for Laser Energetics
250 East River Road
Rochester, NY 14623

Phone: (585)-275-3866
Fax: (585)-275-5960
Email: mingsheng@lle.rochester.edu

APPENDICES

- A Laboratory Basic Science Proposal Cover Page**
- B Laboratory Basic Science Proposal Summary Sheet**
- C Facility Experimental Configuration Summary**

Appendix A – Cover Page

**University of Rochester
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Proposal Title: _____

Principal Investigator(s): _____

Telephone/e-mail: _____

Institutional Affiliation: _____

Address: _____

Submission Date: _____

Appendix B

**OMEGA/OMEGA EP Laboratory Basic Science Proposal–FY2020
Summary Sheet**

Principal Investigator: (Name, Institution, Address)	
Title of Proposed Project:	
Proposed Project Objectives:	
Approach:	
Facility Requirements: (OMEGA/OMEGA EP, diagnostics, etc.)	
Target Types:	
Number of Shots:	
Diagnostic Development Required:	
Equipment Required:	
User Provided Equipment:	

APPENDIX C: FACILITY EXPERIMENTAL CONFIGURATION SUMMARY–FY2020

Proposed Experiment Title: _____

Principal Investigator: _____ **Laboratory:** _____

Facility Required: OMEGA 60 Beam OMEGA EP Joint (OMEGA/OMEGA EP)

Target Requirements:

If hohlraum or half-hohlraum specify:

Axis: _____

Scale size: _____

Material and thickness: _____

If spherical specify:

Diameter/thickness: _____

Materials: _____

Fill gas: _____

If other target, please describe: _____

Target Fabrication:

Total number: _____

Standard target: Yes No

Targets supplied by: _____

Hazardous materials: _____

Laser Configuration:

OMEGA Drive:

Pulse shape: _____ (If new, the design must be received by LLE two months in advance of planned shots):

Beams: _____

Energy (per beam, power setting, or kJ on target): _____

DPP's: _____

OMEGA driver: _____

OMEGA Backlighter:

Pulse shape: _____ Energy: _____ Drivers: _____

Beams: _____

DPP's: _____

Target positioner: _____

OMEGA EP:

Beam	Circle	Requested Configuration	Pulse Width	Energy (J)
1	UV	IR Short-Pulse Sidelighter	_____	_____
2	UV	IR Short-Pulse Backlighter	_____	_____
3	UV	_____	_____	_____
4	UV	_____	_____	_____

Primary Diagnostic Configuration:

TIM based: _____

Fixed: _____

New (please describe): _____
